

NUCLEAR MASS PREDICTIONS WITHIN THE SKYRME HFB THEORY

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To increase the reliability of predictions of nuclear masses at the neutron-drip line we systematically analyze the sensitivity of Hartree-Fock-Bogoliubov (HFB) mass formulae to various physical inputs, such as a density dependence of the pairing interaction, a low effective mass, the symmetry energy, the particle-number projection, ... We typically use a 10-parameter Skyrme force and a 4-parameter δ -function pairing force. The 14 degrees of freedom are adjusted to the masses of all measured nuclei with $N, Z \geq 8$ given in the 2001 and 2003 Audi-Wapstra compilations. The masses of light and proton-rich nuclei are corrected by a 4-parameter phenomenological Wigner term. With more than ten such parameter sets complete mass tables are constructed, going from one drip line to the other, up to $Z=120$. These HFB mass tables are compared with previously published HFBCS and FRDM masses.